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granite in architecture

GRANITE ASSOCIATION

NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION, INC.

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ARCHITECTURAL GRANITE

Granite's unchallenged qualities as a high-grade building material have long been recognized by architects and engineers. Its natural qualifications of exceptional strength and durability, its inherent beauty and character are well-known facts.

Recent technological developments have resulted in revolutionary methods of quarrying and fabrication of granite, thereby reducing its cost and widening its field of application. Granite is available in a wide range of colors and textures.

The varied uses to which building granite is specially adapted may be summarized under three major groups, each having design and specification requirements applicable to type and function of product involved:

STANDARD BUILDING GRANITE

For buildings of standard type construction in which the exterior material is used structurally, either self-supporting or as bonded masonry—

Institutional, Monumental, Office and Commercial Buildings, Mausoleums, and similar building work

GRANITE VENEER

For buildings where the exterior facing serves as a decorative and protective veneer, rather than as a structural element—

Store Fronts, Remodeling Work, Wall and Bridge Facings, and Architectural Interiors

MASONRY GRANITE

For more rugged types of masonry construction in which the exterior material is an integral part of the masonry and in which massive strength and durability are primary requirements—

Heavy Construction, such as—Retaining Walls, Bridge Piers, Abutments, etc.

Building Projects, such as—Schools, Churches, Residences, Apartment Houses, etc.

Architects and Engineers are invited to view granite samples on display at the ARCHITECTS SAMPLES CORPORATION, 101 Park Avenue, New York City, the FEDERAL CONSTRUCTION PRODUCTS CENTER, 7th & D Sts., S. W. Washington, and to call upon the granite manufacturer or the Association for any specific information desired.

GRANITE IN ARCHITECTURE

Specifications for Standard Grade Granite

1957 EDITION

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SECTION 1. General

1-1 Scope

These requirements are intended to govern the fabrication and erection of veneer and structural granite for buildings and similar structures.

1-2 Definitions and Nomenclature

All terms herein relating to fabrication and erection methods shall be construed in accordance with the standard accepted practices of the National Building Granite Quarries Association, Inc.

1-3 Quarry and Plant

The granite shall be obtained from approved quarries having capacity and facilities for furnishing the quantity, sizes and quality of granite required. The cutting and finishing shall be done by firms properly equipped to produce the finished material without causing delay in the progress of the work.

Evidence to this effect must be submitted if required by the Designer.*

1-4 Work Included

The work to be done by the contractor under the heading of Granite shall include the furnishing, delivery and setting in place and completion of all granite work as required by the contract drawings and specifications.

1-5 Shop Drawings

The granite contractor shall prepare all necessary shop drawings, showing the bedding, bonding, and

**Whenever the word Designer is used, it shall mean an Architect, Engineer, Contracting Officer or other specifying authority.*

jointing of all the granite work and typical and special anchoring of same. The dimensions and setting number of each granite stone shall be indicated upon the drawings which shall be submitted through the General Contractor to the Designer. The drawings shall be promptly returned with corrections or approval. No cutting shall be done or work completed except from approved shop drawings.

SECTION 2. Materials

2-1 Stock Materials

Granite, being a natural product, will vary in characteristics. Reasonable variations must be accepted unless premium selection is desired.

The granite shall be of standard grade, free from starts, cracks or seams which might impair its structural integrity. The color shall be in accordance with the Designer's contract specifications.* Inherent variations characteristic of the quarry from which the granite is obtained will be acceptable. All granite furnished shall conform to or be within the range of approved samples.

2-2 Samples

Sufficient samples (6″ x 6″ x 1″) to show the range of color, texture and finish of the granite shall be submitted through the General Contractor to the Designer for approval. Duplicate samples, one set to be returned to the granite contractor for guidance, shall be furnished either when specified or at the granite contractor's option.

SECTION 3. Finishes

3-1 General

The exposed surfaces shall be finished as specified and in accordance with the approved samples.

3-2 Description of Finishes

The specified finish shall be in accordance with the following definitions:

Polished — Mirror gloss with sharp reflections.

Honed — Dull gloss without reflections.

Fine Rubbed — Smooth without gloss. Free from scratches.

Sand Rubbed — Smooth. Slightly pebbled surface as though sand blasted. Occasional slight trail or scratch.

Shot Rubbed — Plane surface. Pronounced circular markings or trails making an indefinite pattern.

8 Cut — Fine hammered. Interrupted parallel markings not over 3/32″ apart. A corrugated finish. Smoother near arris lines and on small surfaces.

6 Cut — Medium hammered. Interrupted parallel markings not over 1/8″ apart. A corrugated finish. Smoother near arris lines and on small surfaces.

4 Cut — Coarse hammered. Interrupted parallel markings not over 7/32″ apart. A corrugated finish. Smoother near arris lines and on small surfaces.

Sawn — Fairly plane surface. Varying texture ranging from close approximation to sand rubbed to scorings 3/32″ in depth. When so specified scorings shall be vertical (V. S. M.) or horizontal (H. S. M.) as produced by gang saws. (Circular scorings (R. S. M.) are produced by rotary or circular saws and are generally found on secondary surfaces.) All exposed surfaces thoroughly sand blasted to remove rust stains and iron particles.

3-3 Surface Tolerances

To provide a suitable method of determining the permissible variation, other than at the arris lines, from a theoretical plane, a straightedge 4 feet in length, applied in any direction, is established as the testing medium.

When the exposed surface is Polished, Honed or Fine Rubbed, it shall not vary at the bed and joint arris lines in excess of one-sixth of the specified bed and joint opening with a minimum variation of 3/64 inch. For all other finishes the variation shall not exceed one-quarter of the specified bed and joint opening.

Internal surface variations shall not deviate either way from the theoretical plane in excess of the following:

FACE FINISH	SURFACE TOLERANCES
Polished	3/64″
Honed	3/64″
Fine Rubbed	3/64″
Sand Rubbed	1/16″
Shot Rubbed	3/32″
8 Cut	3/32″
6 Cut	3/32″
4 Cut	1/8″
Sawn	1/8″*

3-4 Mouldings, Washes and Drips

Mouldings, washes and drips shall be uniform in profile throughout their length in strict conformity with details shown on the contract drawings or on approved shop drawings.

SECTION 4. Beds and Joints

4-1 General

The minimum recommended bed and joint opening is ¼ inch. An increase in the opening tends to decrease the cost of the work, while a reduction

**The Designer should designate either by naming three or more acceptable granites, or by careful definition a reasonable range of color when using other than standard gray granite.*

**Dressed or jobbed as required to meet arris and internal surface tolerances. There shall be no abrupt changes in the surface where the tooling or dressing meets the sawn surface. Sand blasting shall be done after the necessary dressing.*

will, in general, increase the cost. The following specifications can be used for almost all construction requirements.

The stones shall be bedded and joined as indicated on contract drawings or as modified by the approved shop drawings. There shall be no variation in the stone shapes or dimensions in excess of one-quarter of the specified bed and joint opening. The same limitations shall apply to minor irregularities in the arris lines formed by the beds and joints and the exposed face of the stone.

4-2 3/16" or 1/4" Beds and Joints for Polished, Honed or Fine Rubbed Veneer Under 4 Inches in Thickness

The beds and joints shall be sawed or cut full and square back from the face for at least two-thirds the thickness. From that point they may fall under the square not in excess of 1 inch.

4-3 3/16" or 1/4" Beds and Joints for Polished, Honed or Fine Rubbed Structural Granite

The beds and joints shall be sawed or cut full and square 2 inches back from the face. From that point the beds may fall under the square not in excess of 1 inch in 12 inches and shall be reasonably free from large depressions; the joints may fall under the square not in excess of 1½ inches in 12 inches.

4-4 1/4", 3/8" or 1/2" Beds and Joints for Sand Rubbed, Shot Rubbed, Hammered or Sawn Finishes

The beds shall be sawed or cut full and square 2 inches back from the face. From that point the beds may fall under the square not in excess of 1 inch in 12 inches. Joints shall be sawed or cut full and square 1½ inches back from the face. From that point the joints may fall under the square not in excess of 1½ inches in 12 inches. Both beds and joints shall be reasonably free from large depressions.

4-5 1/4", 3/8" or 1/2" Full Sawed Beds and Joints for Sand Rubbed, Shot Rubbed, Hammered or Sawn Finishes

The beds and joints shall be sawed or cut full and square for the specified minimum thickness of the stone. On stones of greater thickness, the remainder shall not fall off in excess of 3 inches in 12 inches.

SECTION 5. Backs of Stones

5-1 General

Because of physical characteristics, most granites cannot be split to a thickness less than one-third the least face dimension. Veneers, in general, must have sawed backs. Structural granite is frequently specified with sawed backs because of design conditions.

5-2 Sawed Backs

The backs of all stones shall be sawed or roughly dressed to approximately true planes. The thickness of the stones shall not vary from the specified or indicated dimension in excess of ⅜ inch either way on stones less than 3 inches in thickness, nor more than ½ inch either way on stones 3 inches or more in thickness. The sawed backs of all stones shall be cleaned of rust stains and iron particles.

5-3 Natural Quarry Split Backs

The backs of all stones may be either scabbled or natural quarry split to approximately vertical surfaces which shall not vary in excess of 1 inch in 12 inches from the true vertical, nor vary in excess of 1 inch either way from the thickness specified or indicated on the drawings. Where required, the granite shall be backed off to clear structural members.

SECTION 6. Dimensions

The suggested minimum veneer thicknesses are as follows:

Polished, Honed or Rubbed	*2" ± ⅜"*
8, 6 or 4 Cut	*4" ± ½"*
Sawn	*3" ± ½"*

A setting space at least 1 inch greater than the nominal thickness is required.

When the designer contemplates the use of the larger sizes of ashlar or large pieces such as solid buttresses, etc., he should consult members of the National Building Granite Quarries Association, Inc. regarding the availability of those sizes.

SECTION 7. Incidental Cutting and Drilling

Where stone thickness permits, all stones weighing over 100 pounds shall have Lewis holes for lifting. Lewis holes shall not come closer than 2 inches from the finished face of the stone. Lewis holes will not be permitted in exposed portions, except with written permission of the designer.

Holes for posts, lamps, door checks and similar work for other trades shall be cut by the granite contractor when specifically indicated on the contract drawings and in the granite section of the specifications.

Holes and sinkages required for anchors, cramps and dowels shall be cut in accordance with approved shop drawings.

SECTION 8. Shipping and Handling

The finished granite shall be carefully loaded and packed for shipment using all reasonable and customary precautions against damage in transit. No material which would cause staining or discoloration shall be used for blocking or packing. Upon receipt at the site or storage yard, the granite shall be stacked on timber or platforms at least 4 inches above the ground. Extreme care shall be exercised to prevent staining during the storage period. Lewis holes shall be plugged during freezing weather to prevent accumulation of water. Salt shall not be used for melting ice in Lewis holes or for any other purpose.

SECTION 9. Mortar and Grout

The mortar for setting the granite shall be composed of 1 part non-staining cement (either Portland or slag) and 1 part of plastic lime hydrate to 4 or 5 parts* of clean sand. The pointing mortar shall be of the same composition.

The mortar shall be mixed in small batches, to make a stiff, plastic mass. It shall be mixed until it is thoroughly homogeneous. Mortar shall not be used until it has set for 1 hour, and may be used up to 2 hours after mixing.

The sand used shall be such as to cause no stain or chemical action with the cement. The water shall be clear, non-alkaline and devoid of salts or other injurious elements.

Mortar fill for backing between granite and other materials shall be the same as for setting. Only sufficient water shall be added to permit placing and tamping.

SECTION 10. Setting

All setting shall be done by competent stone setters in accordance with the approved granite shop drawings.

Each granite stone shall be clean and dry before being set. Each piece shall be carefully bedded in a full bed of mortar and tapped home with a rawhide mallet to a full and solid bearing. All vertical joints shall be completely filled.

Particular care shall be exercised when setting the granite to equalize the bed and joint openings and to eliminate the necessity of redressing or jobbing of exposed surfaces.

The face of the granite work shall be kept free from mortar at all times.

Granite facing shall not in any case be built up more than two courses ahead of the backing and no stone having a greater width of bed than the one below it shall be set until the lower course is backed up.

All joints and beds shall be raked out to a depth of at least ¾ inch and every precaution taken to prevent stones bearing upon the edges.

Sills, etc., subject to uneven pressure, shall be bedded only at the ends.

SECTION 11. Backing

The backing shall be in accordance with contract drawings and specifications. Where structural concrete is to be poured as backing, the backs of all beds and joints shall be parged with not less than ½ inch of non-staining setting mortar as specified above. No concrete shall be poured until the parging mortar has set. The stones shall be braced if necessary, to avoid displacement.

The space between the backs of the granite and precast concrete construction shall be filled using specified non-staining cement grout of the same composition as for setting. Such poured backing shall be thoroughly rodded to eliminate all voids. Care shall be taken to avoid displacement of the granite.

Fine sand, use 4 parts; coarse sand, use 5 parts.

SECTION 12. Anchors, Dowels, Etc.

All granite shall be anchored or dowelled in accordance with the approved granite shop drawings.

All steel anchors or cramps shall be thoroughly galvanized after fabrication.

All dowels, unless otherwise specified, shall be of heavy brass pipe of the sizes detailed.

Anchors, dowels, etc., shall be inserted in mortar filled holes in the granite.

SECTION 13. Pointing

All face joints, previously raked, shall be brushed clean. The joints shall be pointed in two stages, and brought to a flat cut joint after the last stage. When thumb-print hard, joint with a round jointer ⅛ inch larger in diameter than the joint.

All open joints under sills, etc., shall be pointed for a depth of at least 1 inch.

At special locations, when directed, the joints shall be pointed and finished as the setting progresses.

Where specified, exposed joints shall be satisfactorily caulked with lead wool or approved caulking compound and finished as directed.

SECTION 14. Cleaning

After completion of the granite work and after liability of stain from other operations has passed, the granite work shall be carefully cleaned, removing all dirt, mortar, stains or other defacements.

The use of wire brushes, acid or solutions which might cause discoloration is expressly prohibited. Particular care must be exercised to prevent discoloration and stain from drip or washing down of cleaning operations on work above the granite.

Cleaning shall start at the top and be continued until completed.

SECTION 15. Protection of Finished Work

All granite work in the structure shall be protected from damage. Protective boxing or other suitable means shall be employed whenever required without specific instructions from the designer. No lumber or material liable to stain or deface the granite shall be used. All nails used shall be galvanized.

All granite work shall be protected from water at all times during construction by weighted tarpaulins.

SECTION 16. Defective Work

No patching or hiding of defects will be permitted. Any stone showing flaws or imperfections upon receipt at the storage yard or at the site, shall be referred to the designer for determination as to responsibility and decision as to whether the stone shall be rejected, or redressed for use in the structure.

COLOR CLASSIFICATION

granites quarried by association members

COLOR	GRAIN	NAME OF GRANITE	LOCATION	QUARRIED BY
white				
White	Medium	Chelmsford White	West Chelmsford, Mass.	H. E. Fletcher Co.
White	Fine	North Jay White	North Jay, Me.	Maine & New Hampshire Granite Corp.
White	Medium	Mount Airy White	Mount Airy, N. C.	North Carolina Granite Corp.
White	Fine	Sierra White	Raymond, Calif.	Raymond Granite Co.
gray				
Dark to Purple Gray	Coarse	Crystal Gray	Cold Spring, Minn.	Cold Spring Granite Co.
Dark Gray	Fine	Oxford Gray	Cold Spring, Minn.	Cold Spring Granite Co.
Light Gray	Medium	Diamond Gray	Isle, Minn.	Cold Spring Granite Co.
Light to medium gray	Coarse	Rockville	Rockville, Minn.	Cold Spring Granite Co.
Dark to greenish gray	Medium	Mason	Mason, N. H.	H. E. Fletcher Co.
Light gray	Fine	Chelmsford Gray	West Chelmsford, Mass.	H. E. Fletcher Co.
Light to medium gray	Fine to medium	Swenson gray	Concord, N. H.	The John Swenson Granite Co., Inc.
Very light gray	Fine	North Jay	North Jay, Me.	Maine & New Hampshire Granite Corp.
Very light gray	Medium	Mount Airy	Mount Airy, N. C.	North Carolina Granite Corp.
buff				
Gray buff with black spots	Medium to coarse	Cold Spring Diamond Pink	Cold Spring, Minn.	Cold Spring Granite Co.
Greenish gray and brown variegated	Medium	Bears Den Quarry	Mason, N. H.	H. E. Fletcher Co.
Brown with dark spots	Medium to coarse	Milford Buff	Milford, Mass.	H. E. Fletcher Co.
Light grayish buff	Fine to medium	Chelmsford Bulfinch	West Chelmsford, Mass.	H. E. Fletcer Co.
Light to medium brown	Fine to medium	Swenson Buff Antique	Concord, N. H.	The John Swenson Granite Co., Inc.
pink				
Pink and black	Fine	Cold Spring Rainbow	Morton, Minn.	Cold Spring Granite Co.
Pinkish gray	Medium	Deer Island	Stonington, Me.	Deer Island Granite Corp.
Pink	Medium	Sherwood Pink	Stonington, Me.	Deer Island Granite Corp.
Pink with dark spots	Medium to coarse	Milford Pink	Milford, Mass.	H. E. Fletcher Co.
Pinkish gray	Medium	St. John	Quebec	H. E. Fletcher Co.
Light pink with occasional black waves and pink stripes	Medium to coarse	Swenson Pink	Wells, Me.	The John Swenson Granite Co., Inc.
Reddish pink mottled with large gray and medium black spots	Coarse	Conway Pink	Redstone, N. H.	Redstone Properties, Inc.
Pink	Coarse	Texas Pink	Granite Mountain, Marble Falls, Texas	Texas Pink Granite Corp.
Pink	Medium to coarse	New Hampshire Pink	Madison, N. H.	H. E. Fletcher Co.
red				
Brownish red	Medium	Cold Spring Agate	Ortonville, Minn.	Cold Spring Granite Co.
Brownish red	Fine	Ruby Red	Ortonville, Minn.	Cold Spring Granite Co.
Brownish red	Medium	Cold Spring Carnelian	Milbank, S. D.	Cold Spring Granite Co.
Bright red	Fine	Cold Spring Bright Red	Wausau, Wis.	Cold Spring Granite Co.
Light Red	Coarse	Conway	Conway, N. H.	H. E. Fletcher Co.
Light Red	Medium to coarse	New Hampshire Pink	Madison, N. H.	H. E. Fletcher Co.
green				
Dark greenish gray with brown and black spottings	Coarse	Opalescent	Cold Spring, Minn.	Cold Spring Granite Co.
Dark yellowish greenish gray with black spottings	Coarse	Conway Green	Redstone, N. H.	Redstone Properties, Inc.
black				
Black (Bronze)	Medium	Cold Spring Veined Ebony	Mellen, Wis.	Cold Spring Granite Co.

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REDSTONE PROPERTIES, INC.

Redstone, New Hampshire—Tel. North Conway, N. H. 473

THE JOHN SWENSON GRANITE COMPANY, INC.

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Representatives:

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